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1 A graph partitioning algorithm by node separators

Joseph W. H. Liu

September 1989 **ACM Transactions on Mathematical Software (TOMS)**, Volume 15 Issue 3

Publisher: ACM Press

Full text available: pdf(1.64 MB) Additional Information: full citation, abstract, references, citings, index terms, review

A heuristic graph partitioning scheme is presented to determine effective node separators for undirected graphs. An initial separator is first obtained from the minimum degree ordering, an algorithm designed originally to produce fill-reducing orderings for sparse matrices. The separator is then improved by an iterative strategy based on some known results from bipartite graph matching. This gives an overall practical scheme in partitioning graphs. Experimental results are provided to demon ...

2 Session 4B: Approximation algorithm for k-node connected subgraphs via critical graphs

G. Kortsarz, Z. Nutov

June 2004 **Proceedings of the thirty-sixth annual ACM symposium on Theory of computing**

Publisher: ACM Press

Full text available: pdf(210.42 KB) Additional Information: full citation, abstract, references, index terms

We present two new approximation algorithms for the problem of finding a k-node connected spanning subgraph (directed or undirected) of minimum cost. The best known approximation guarantees for this problem were $O(\min(k, n/\sqrt{n-k}))$ for both directed and undirected graphs, and $O(\ln k)$ for undirected graphs with $n \geq 6k^2$, where n is the number of nodes in the input graph. Our first algorithm has approx ...

3 Graph Algorithms for Functional Dependency Manipulation

Giorgio Ausiello, Alessandro D'Atri, Domenico Saccà

October 1983 **Journal of the ACM (JACM)**, Volume 30 Issue 4

Publisher: ACM Press

Full text available: pdf(791.08 KB) Additional Information: full citation, references, citings, index terms

4 A linear time algorithm for placing &phgr;-nodes

Vugranam C. Sreedhar, Guang R. Gao

January 1995 **Proceedings of the 22nd ACM SIGPLAN-SIGACT symposium on Principles of programming languages**

Publisher: ACM Press

Full text available: pdf(1.35 MB) Additional Information: full citation, abstract, references, citings, index terms

Dataflow analysis framework based on Static Single Assignment (SSA) form and Sparse

Evaluation Graphs (SEGs) demand fast computation of program points where data flow information must be merged, the so-called &fgr;-nodes. In this paper, we present a surprisingly simple algorithm for computing &fgr;-nodes for arbitrary flowgraphs (reducible or irreducible) that runs in linear time. We employ a novel program representation—the DJ graph—by ...

5 Approximation algorithms for NP-complete problems on planar graphs



Brenda S. Baker
January 1994 **Journal of the ACM (JACM)**, Volume 41 Issue 1
Publisher: ACM Press
Full text available: pdf(1.98 MB) Additional Information: full citation, references, citings, index terms

Keywords: Hamiltonian circuit, Hamiltonian path, NP-complete, approximation algorithms, approximation schemes, dominating set, independent set, partition into perfect matchings, partition into triangles, planar graphs, vertex cover

6 A graph based algorithm for optimal buffer insertion under accurate delay models

Y. Gao, D. Wong
March 2001 **Proceedings of the conference on Design, automation and test in Europe**
Publisher: IEEE Press
Full text available: pdf(294.41 KB) Additional Information: full citation, references, citings, index terms

7 Sparsification—a technique for speeding up dynamic graph algorithms



David Eppstein, Zvi Galil, Giuseppe F. Italiano, Amnon Nissenzweig
September 1997 **Journal of the ACM (JACM)**, Volume 44 Issue 5
Publisher: ACM Press
Full text available: pdf(160.07 KB) Additional Information: full citation, abstract, references, citings, index terms, review

We provide data strutures that maintain a graph as edges are inserted and deleted, and keep track of the following properties with the following times: minimum spanning forests, graph connectivity, graph 2-edge connectivity, and bipartiteness in timeO(n1/2) per change; 3-edge connectivity, in time O(n2/3) per change; 4-edge connectivity, in time O(n ...

Keywords: dynamic graph algorithms, edge and vertex connectivity, minimum spanning trees

8 A framework for call graph construction algorithms



David Grove, Craig Chambers
November 2001 **ACM Transactions on Programming Languages and Systems (TOPLAS)**, Volume 23 Issue 6
Publisher: ACM Press
Full text available: pdf(1.36 MB) Additional Information: full citation, abstract, references, citings, index terms

A large number of call graph construction algorithms for object-oriented and functional languages have been proposed, each embodying different tradeoffs between analysis cost and call graph precision. In this article we present a unifying framework for understanding call graph construction algorithms and an empirical comparison of a representative set of algorithms. We first present a general parameterized algorithm that encompasses many well-known and novel call graph construction algorithms. W ...

Keywords: Call graph construction, control flow analysis, interprocedural analysis

9 Design Automation: Minimizing resources in a repeating schedule for a split-node

data-flow graph
Timothy W. O'Neil, Edwin H.-M. Sha
April 2002 **Proceedings of the 12th ACM Great Lakes symposium on VLSI**
Publisher: ACM Press
Full text available: pdf(119.07 KB) Additional Information: full citation, abstract, references, index terms

Many computation-intensive or recursive applications commonly found in digital signal processing and image processing applications can be represented by *data-flow graphs* (DFGs). In our previous work, we proposed a new technique, *extended retiming*, which can be combined with minimal unfolding to transform a DFG into one which is rate-optimal. The result, however, is a DFG with split nodes, a concise representation for pipelined schedules. This model and the extraction of the pipelin ...

10 Faster algorithms for finding small edge cuts in planar graphs
Satish B. Rao
July 1992 **Proceedings of the twenty-fourth annual ACM symposium on Theory of computing**
Publisher: ACM Press
Full text available: pdf(1.36 MB) Additional Information: full citation, abstract, references, citings, index terms

In this paper, we consider partitioning a planar graph by removing either nodes or edges. In particular, we consider a cut to be either a set of nodes or edges whose removal divides the graph into two pieces. We define the balance of a cut as the ratio of the weight of the smaller side of the cut to the total weight in the graph. Thus, the best possible balance is 1/2. We define the quotient cost of a cut as the ratio of the cost of the cut to th ...

11 Session 8C: Oblivious routing on node-capacitated and directed graphs
Mohammad T. Hajiaghayi, Robert D. Kleinberg, Tom Leighton, Harald Räcke
January 2005 **Proceedings of the sixteenth annual ACM-SIAM symposium on Discrete algorithms**
Publisher: Society for Industrial and Applied Mathematics
Full text available: pdf(841.24 KB) Additional Information: full citation, abstract, references

Oblivious routing algorithms for general undirected networks were introduced by Räcke [17], and this work has led to many subsequent improvements and applications. Comparatively little is known about oblivious routing in general *directed* networks, or even in undirected networks with node capacities.We present the first non-trivial upper bounds for both these cases, providing algorithms for k-commodity oblivious routing problems with competitive ratio $O(\sqrt{k}\log$...

12 Making graphs reducible with controlled node splitting
Johan Janssen, Henk Corporaal
November 1997 **ACM Transactions on Programming Languages and Systems (TOPLAS)**, Volume 19 Issue 6
Publisher: ACM Press
Full text available: pdf(312.62 KB) Additional Information: full citation, abstract, references, citings, index terms

Several compiler optimizations, such as data flow analysis, the exploitation of instruction-level parallelism (ILP), loop transformations, and memory disambiguation, require programs with reducible control flow graphs. However, not all programs satisfy this property. A new method for transforming irreducible control flow graphs to reducible control flow graphs, called Controlled Node Splitting (CNS), is presented. CNS duplicates nodes of the control flow graph to obtain reducible control fl ...

Keywords: compilation, control flow graphs, instruction-level parallelism, irreducibility, node splitting, reducibility

13 Force-transfer: a new approach to removing overlapping nodes in graph layout
Xiaodi Huang, Wei Lai
February 2003 **Proceedings of the twenty-sixth Australasian computer science**

conference on Conference in research and practice in information technology - Volume 16 CRIPTS '03

Publisher: Australian Computer Society, Inc.

Full text available: pdf(311.27 KB) Additional Information: full citation, abstract, references, index terms

Graphs where each node includes an amount of text are often used in applications. A typical example of such graphs is UML diagrams used in CASE tools. To make text information in each node readable in displaying such graphs, it is required there should be no overlapping nodes. This paper proposes the Force-Transfer algorithm to give a new efficient approach to removing overlapping nodes. The proposed approach employs a heuristic method to approximate the global optimal adjustment with the local ...

Keywords: force transfer, graph layout, mental map, neighbor nodes, node overlapping

14 A Fast Implementation of the Minimum Degree Algorithm Using Quotient Graphs

Alan George, Joseph W. H. Liu

September 1980 **ACM Transactions on Mathematical Software (TOMS)**, Volume 6 Issue 3

Publisher: ACM Press

Full text available: pdf(1.20 MB) Additional Information: full citation, references, citings, index terms

15 An Efficient Algorithm for Graph Isomorphism

D. G. Corneil, C. C. Gotlieb

January 1970 **Journal of the ACM (JACM)**, Volume 17 Issue 1

Publisher: ACM Press

Full text available: pdf(767.75 KB) Additional Information: full citation, references, citings, index terms

16 Transitive closure algorithms based on graph traversal

Yannis Ioannidis, Raghu Ramakrishnan, Linda Winger

September 1993 **ACM Transactions on Database Systems (TODS)**, Volume 18 Issue 3

Publisher: ACM Press

Full text available: pdf(4.34 MB) Additional Information: full citation, abstract, references, citings, index terms

Several graph-based algorithms have been proposed in the literature to compute the transitive closure of a directed graph. We develop two new algorithms (Basic_TC and Gobal_DFTC) and compare the performance of their implementations in a disk-based environment with a well-known graph-based algorithm proposed by Schmitz. Our algorithms use depth-first search to traverse a graph and a technique called marking to avoid processing some of the arcs in the graph. They compute the ...

Keywords: depth-first search, node reachability, path computations, transitive closure

17 Using node merging to enhance graph coloring

Steven R. Vegdahl

May 1999 **ACM SIGPLAN Notices , Proceedings of the ACM SIGPLAN 1999 conference on Programming language design and implementation PLDI '99**, Volume 34 Issue 5

Publisher: ACM Press

Full text available: pdf(604.12 KB) Additional Information: full citation, abstract, references, citings, index terms

A Chaitin-style register allocator often blocks during its simplification phase because no node in the interference graph has a degree that is sufficiently small. Typically, this is handled by node-splitting, or by optimistically continuing---and hoping that a legal N-coloring will still be found. We observe that the merging of two nodes in a graph causes a reduction in the degree of any node that had been adjacent to both. We have enhanced Chaitin's coloring algorithm so that it attempts node-m ...

Keywords: graph coloring, register allocation, register coalescing

18 Static scheduling algorithms for allocating directed task graphs to multiprocessors

Yu-Kwong Kwok, Ishfaq Ahmad

December 1999 **ACM Computing Surveys (CSUR)**, Volume 31 Issue 4

Publisher: ACM Press

Full text available: pdf(723.58 KB) Additional Information: full citation, abstract, references, citings, index terms

Static scheduling of a program represented by a directed task graph on a multiprocessor system to minimize the program completion time is a well-known problem in parallel processing. Since finding an optimal schedule is an NP-complete problem in general, researchers have resorted to devising efficient heuristics. A plethora of heuristics have been proposed based on a wide spectrum of techniques, including branch-and-bound, integer-programming, searching, graph-theory, randomization, genetic ...

Keywords: DAG, automatic parallelization, multiprocessors, parallel processing, software tools, static scheduling, task graphs

19 Fast algorithms for k-shredders and k-node connectivity augmentation (extended abstract)

Joseph Cheriyan, Ramakrishna Thurimella

July 1996 **Proceedings of the twenty-eighth annual ACM symposium on Theory of computing**

Publisher: ACM Press

Full text available: pdf(1.21 MB) Additional Information: full citation, references, citings, index terms

20 RNG and internal node based broadcasting algorithms for wireless one-to-one networks

Mahtab Seddigh, Julio Solano González, Ivan Stojmenovic

April 2001 **ACM SIGMOBILE Mobile Computing and Communications Review**, Volume 5 Issue 2

Publisher: ACM Press

Full text available: pdf(758.78 KB) Additional Information: full citation, abstract, references, citings

In a multihop wireless network, each node has a transmission radius and is able to send a message to one of its neighbors (one-to-one) or all of its neighbors (one-to-all) that are located within the radius. In a broadcasting task, a source node needs to send the same message to all the nodes in the network. In this paper, we propose to reduce the communication overhead of broadcasting algorithm for one-to-one model by applying the concepts of planar graphs such as RNG (relative neighborhood gra ...

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IEEE CNF	IEEE Conference Proceeding
IEE CNF	IEE Conference Proceeding
IEEE STD	IEEE Standard

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21. **Parallel pointer-based join techniques for object-oriented databases**
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